

Figure 6.--Flood boundaries for the 50-, 100-, and 500-year floods, Childs Draw tributary, confluence with main channel to Hynds Boulevard.

College Drive to Ridge Road. Flow hydraulics in this reach were controlled by the shape, slope, and roughness of the broad, nearly flat channel. Channel slopes ranged from 0.002 to 0.007 foot per foot, and channel width approached 500 feet. Water-surface elevations were computed using WSPRO (Shearman and others, 1986).

Ridge Road culvert and roadway. A stage-discharge rating curve was developed for flow over the centerline of Ridge Road using methods described by Hulsing (1967). Discharge through the corrugated-metal-pipe culvert was routed using methods described by Bodhaine (1968). Water-surface elevations for the 50-, 100-, and 500-year floods were computed from a stage-discharge rating curve that combined the stage-discharge ratings for flow over the road and flow through the culvert.

Ridge Road to Four Mile Road. The shape, slope, and roughness of the channel determined the hydraulics of the 50-, 100-, and 500-year floods. Numerous headcuts and scour holes in the channel were observed. Water-surface elevations were computed using WSPRO (Shearman and others, 1986).

Four Mile Road culvert and roadway. A stage-discharge rating curve was developed for flow over the centerline of Four Mile Road using methods described by Hulsing (1967). Flow through the corrugated-metal-pipe culvert was routed using methods described by Bodhaine (1968). Water-surface elevations for the 50-, 100-, and 500-year floods were computed from a stage-discharge rating curve that combined the ratings for flow over the road and flow through the culvert.

Four Mile Road to Powderhouse Road. The embankment at Four Mile Road produced high water levels and substantial ponding immediately upstream from the embankment. Upstream from the ponded condition, the shape, slope, and roughness of the channel determined the hydraulics associated with the floods. Water-surface elevations were computed using WSPRO (Shearman and others, 1986).

Childs Draw Main Channel, Powderhouse Road to Hynds Boulevard

Flood boundaries for the 50-, 100-, and 500-year floods for this reach are shown in figure 4; water-surface profiles for the reach from Powderhouse Road and Hynds Boulevard along the main channel of Childs Draw are shown in figure 5.

Powderhouse Road culvert and roadway. A stage-discharge rating curve was developed for flow over the centerline of Powderhouse Road using methods described by Hulsing (1967). Flow through the small culvert under the road was considered small in comparison with the flood discharges and was not included in the stage-discharge rating.

Powderhouse Road to Cowpoke Road. The shape, roughness, and slope of the channel determined the hydraulics of the floods. Water-surface elevations were computed using WSPRO (Shearman and others, 1986).

Cowpoke Road roadway. A stage-discharge rating curve was developed for flow over the centerline of this gravel road using the methods described by Hulsing (1967). No culverts were present.

Cowpoke Road to Yellowstone Road. The shape, roughness, and slope of the channel determined the hydraulics of the 50-, 100-, and 500-year floods. The presence and placement of houses, fences, and other structures was not a factor in determining flow conditions. Water-surface elevations were computed using WSPRO (Shearman and others, 1986).

Yellowstone Road culverts and roadway. Flow through two concrete culverts was routed using methods described by Bodhaine (1968). A stage-discharge rating curve was developed for flow over Yellowstone Road using methods described by Hulsing (1967). A single stage-discharge rating curve for this site was developed by combining the culvert and roadway computations.

Yellowstone Road to West Riding Club Road. The road embankment of Yellowstone Road caused substantial ponding upstream of the roadway. Upstream from the ponded condition, the shape, slope, and roughness of the channel determined the hydraulics of the floods. Water-surface elevations were computed using WSPRO (Shearman and others, 1986).

West Riding Club Road culvert and roadway. Flow through the culvert was routed using methods described by Bodhaine (1968). A stage-discharge rating curve also was developed for flow over the road using methods described by Hulsing (1967). A single stage-discharge rating for this site was developed by combining the culvert and roadway computations.

West Riding Club Road to Hynds Boulevard. Water-surface elevations for the flood discharges were computed using WSPRO (Shearman and others, 1986). The shape, slope, and roughness of the natural channel determined the hydraulics of this reach.

Childs Draw Tributary, Confluence with Main Channel to Hynds Boulevard

Flood boundaries for the 50-, 100-, and 500-year floods for this reach are shown in figure 6; water-surface elevations for the tributary of Childs Draw, from the confluence with the main channel to Hynds Boulevard, are shown in figure 7.

Confluence with main channel to Powderhouse Road. The slope, shape, and roughness of the natural channel determined the flow hydraulics in this reach. Space Drive was treated as a vertical contraction in the channel rather than as a gravel roadway. WSPRO (Shearman and others, 1986) was used to compute water-surface elevations for the design floods.

Powderhouse Road culverts and roadway. Flow through three corrugated-metal-pipe culverts was routed using methods described by Bodhaine (1968), while flow over the centerline of the paved roadway was routed using methods described by Hulsing (1967). The overall stage-discharge rating represented a combination of flow over the roadway and flow through the culverts.

Powderhouse Road to Four Mile Road. Ponded conditions were identified upstream from Powderhouse Road; thus, the road embankment as well as the shape, slope, and roughness of the natural channel determined the hydraulics for the flood discharges. WSPRO (Shearman and others, 1986) was used to compute the water-surface elevations.

Four Mile Road culvert and roadway. Methods described by Hulsing (1967) were used to route the flow over the roadway. Flow through the single corrugated-metal-pipe culvert was routed using procedures described by Bodhaine (1968). A single rating combined flow over the roadway and through the culvert.

Four Mile Road to Yellowstone Road. The channel shape, slope, and roughness determined the hydraulics in this reach. Numerous headcuts, sidecuts, scour holes, and minor tributaries were evident, although the channel was not well-defined downstream of Chisholm Trail. Chisholm Trail was treated as a vertical contraction in the channel rather than a gravel roadway. WSPRO (Shearman and others, 1986) was used to compute the water-surface elevations of the 50-, 100-, and 500-year floods.

Yellowstone Road culvert and roadway. Flow through a single concrete culvert was routed using methods described by Bodhaine (1968). Flow over the centerline of Yellowstone Road was routed using methods described by Hulsing (1967). A single stage-discharge rating curve represented a combination of flow through the culvert and flow over the roadway.

Yellowstone Road to Hynds Boulevard. Substantial ponding was identified at the approach section to the Yellowstone Road embankment. The channel was poorly defined, but the roughness, shape, and slope of the channel and near channel area determined the hydraulics for the floods. WSPRO (Shearman and others, 1986) was used to compute water-surface elevations in this reach.

FLOOD BOUNDARIES

Boundaries of the 50-, 100-, and 500-year floods were delineated using the computed water-surface elevations at each surveyed cross section. Flood boundaries corresponding to the computed water-surface elevations were plotted at each surveyed cross section using the topographic information on the orthophotographs. Flood boundaries were drawn between surveyed cross sections based on the topographic contouring on the orthophotographs dated April 1984. Areas not subject to active flow, but which nevertheless were inundated, are identified and shown.

In the cases where a road was present during the onsite survey but was not shown on the 1984 orthophotographs (such as Four Mile Road from Powderhouse Road to Yellowstone Road), flood boundaries were computed based on road characteristics described during the onsite survey. The resulting flood boundaries corresponding to the water-surface elevations of the floods were then drawn on the basis of topographic contours on the orthophotographs. Similarly, if a roadway was modified by paving or embankment changes between 1984 and the time of the onsite survey, water-surface computations were made on the basis of data obtained at the time of the survey, and flood boundaries were delineated according to the contours on the 1984 orthophotographs.

Channel changes, channel or floodplain encroachments, or roadway modifications in the channel since the onsite survey was completed (August 1991) would cause different flood elevations than those reported for this analysis.

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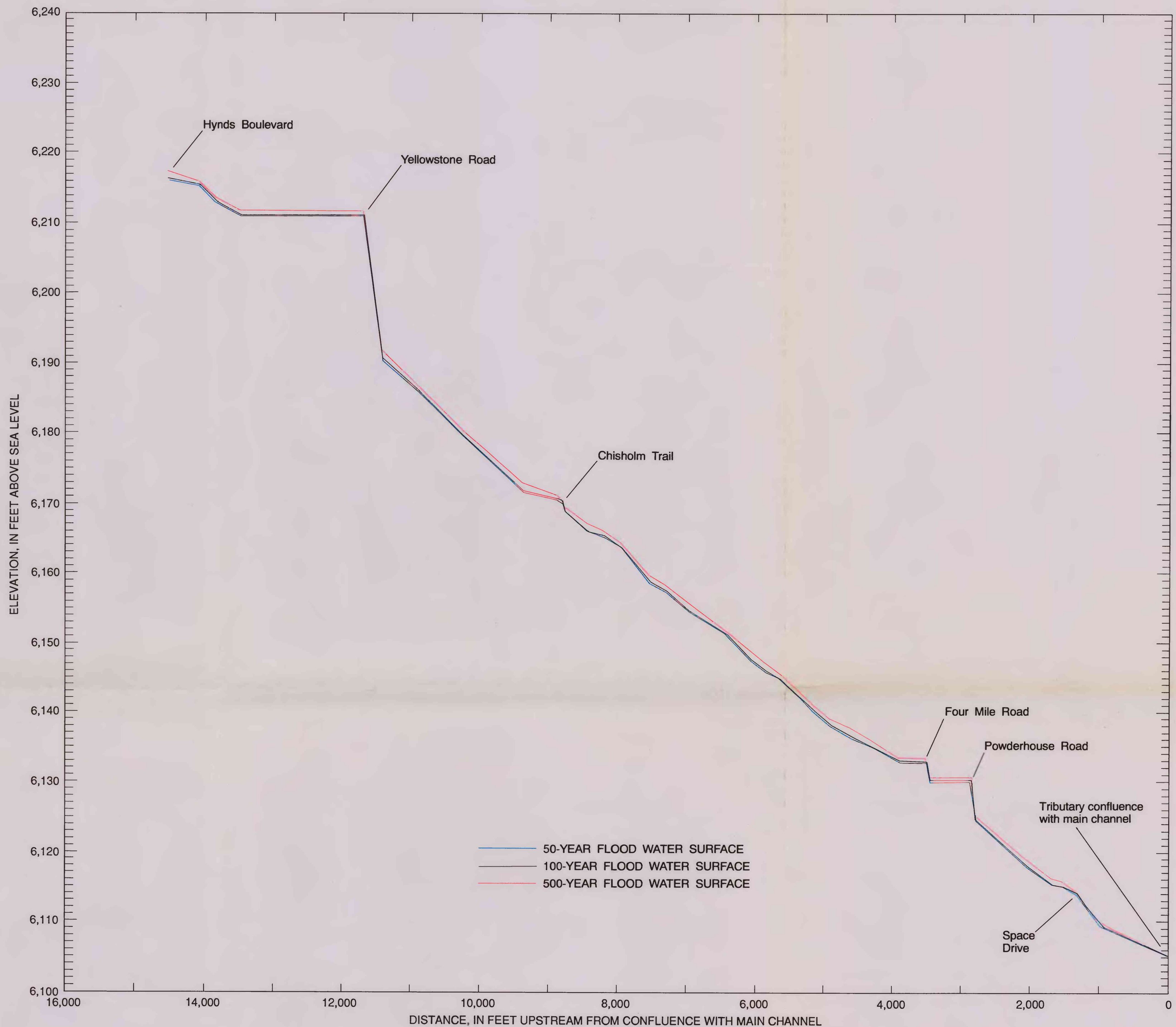


Figure 7.--Water-surface profiles for the 50-, 100-, and 500-year floods, Childs Draw tributary, confluence with main channel to Hynds Boulevard.

FLOOD BOUNDARIES AND WATER-SURFACE PROFILES FOR THE COMPUTED 50-, 100-, AND 500-YEAR FLOODS, CHILDS DRAW AND TRIBUTARY NEAR CHEYENNE, WYOMING, AUGUST 1991

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